- Memory Leak Fix
- Ideal Pattern Recognition Tracking

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# Memory Leak Fix

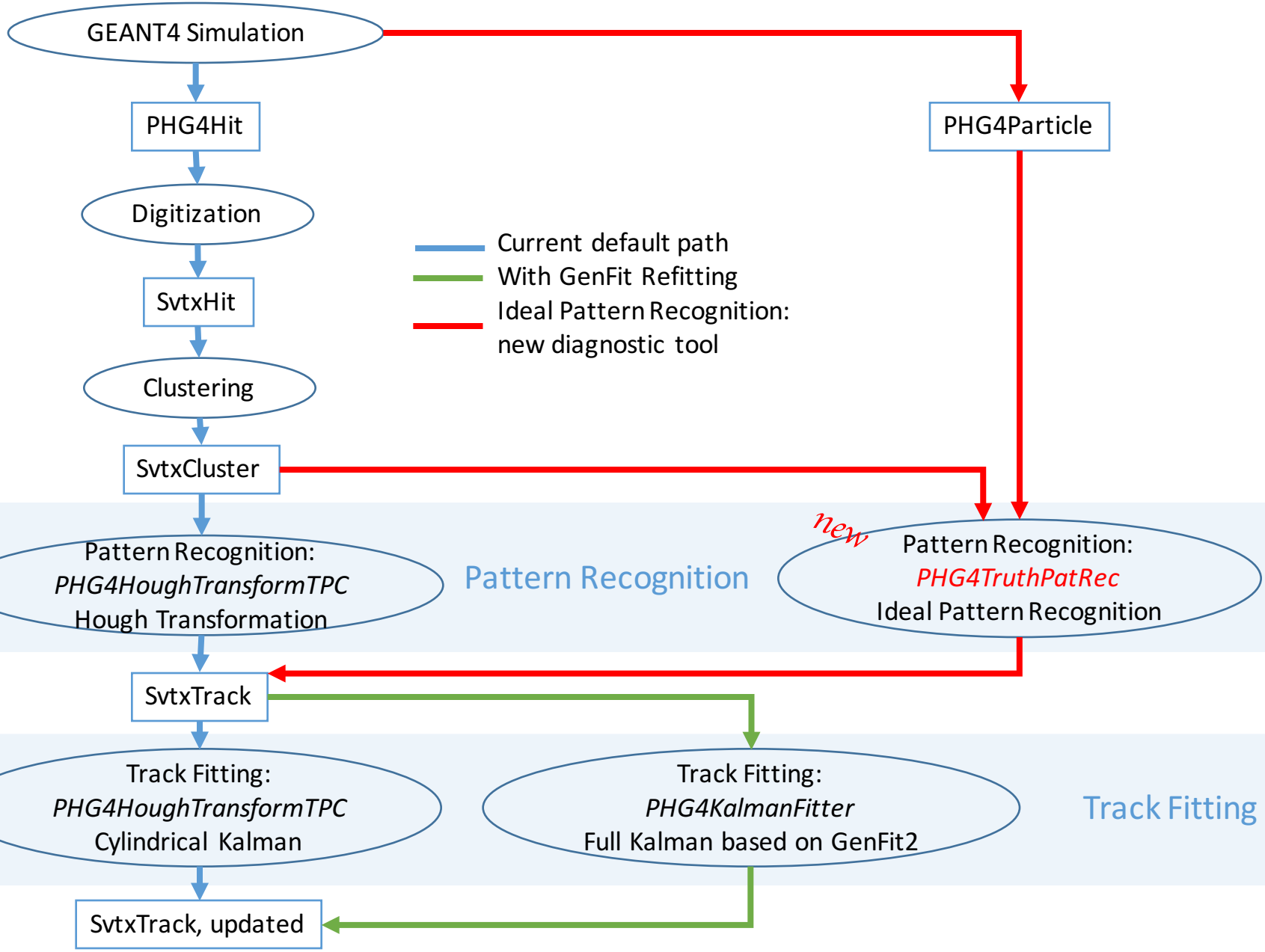
Pull Request 247:
https://github.com/sPHENIX-Collaboration/coresoftware/pull/247

Related code:

- PHGenFit: interface to GenFit
- PHG4TrackKalmanFitter: refitting module based on PHGenFit

- After this fix there are still some one time leaks that are not scaling with event number
  - When loading libRaveVertex.so
  - Some one time leaks related to TGeo

# Overview of sPHENIX tracking and new module introduced



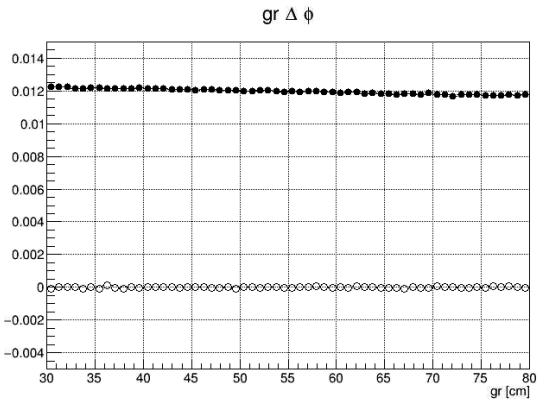
# Ideal Pattern Recognition + Kalman Filter

Ideal Pattern Recognition: Group SvtxClusters based on truth association

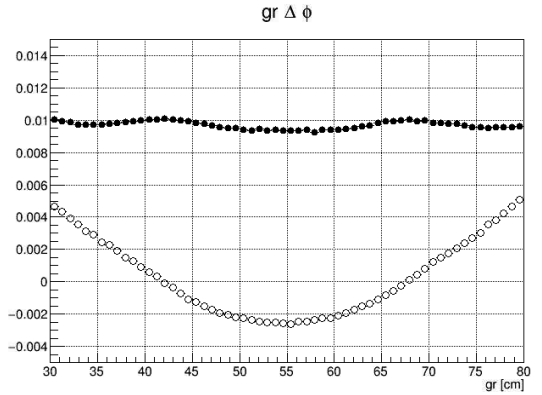
Motivation:

- Benchmark and crosscheck for realistic pattern recognition by decoupling the clustering, pattern recognition and track fitting
- Help tuning electron track fitting which has a non Gaussian radiation tail in energy loss and multiple scattering

All clusters




Clusters grouped by current pattern recognition



# Ideal Pattern Recognition Tracking

## Clustering

- Detector response, digitization, etc

*new*

## Pattern Recognition: PHG4TruthPatRec

- Loop over all clusters
  - Trace truth particle via SvtxCluster ⟶ SvtxHit ⟶ PHG4CylinderCell ⟶ PHG4Hit ⟶ Truth particleID
  - Build particleID ⟶ SvtxCluster map

- Loop over all partitcles
  - If associated SvtxClusters > Cut (10 for now)
    - Fill SvtxTrack::clustermap

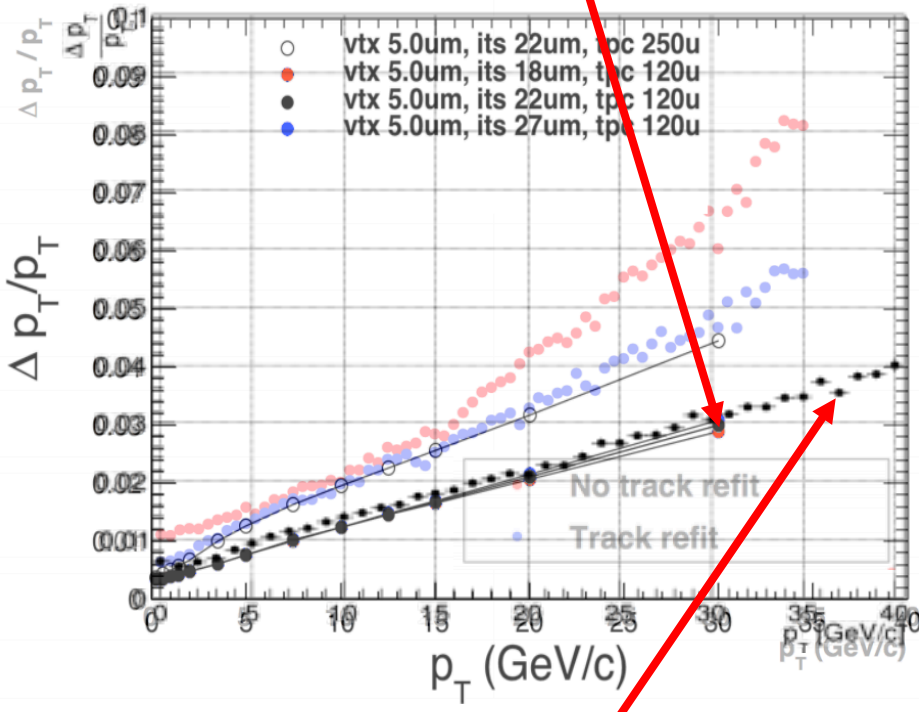
## Track Fitting

Feed all the SvtxTracks with associated clusters to PHG4TrackKalmanFitter to do track fitting

# Single pion tracking, Cylindrical MAPS+IT+TPC

- PHG4TruthPatRec almost finished need some final touch
- Tested with cylindrical tracker single pion
  - pT resolution consistent with LiC toy simulation

Bench mark: LiC toy simulation by Christof Roland




New: Geant4 + Ideal Patter Recognition + Full Kalman fit (GenFit2)

# Backups